NOKIA 6650

NHM-1

Transceiver Features

Transceiver main HW parts/ features include:

- WCDMA/GSM900/PCN1800/GPRS
- Bluetooth and IR for cordless communication
- USB data transfer and connectivity with a PC
- Full graphic Colour Display
- UI with two soft keys and four way+ select navigation key
- Integrated IR link & internal data
- Internal Hands Free (IHF) Speaker
- Pop-Port ™ accessory interface
- Plug-in SIM card
- External WCDMA antenna
- Internal GSM 900/1800 antenna and BT antenna
- Integrated digital camera providing video and still picture
- Polyphonic ringing tones
- Voice recognition: 50 names and commands
- Built-in recorder up to 4min 20sec

Transceiver with BLC-2 1000mAh Li-ion battery pack

Talk time	Standby	Note
Up to 2h - 3h 10min (WCDMA) Up to 3h 10min - 4h 20min (GSM)	Up to 7 - 14 days	Depends on network parameters

SERVICE MANUAL

Service Level 1&2

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CHANGE HISTORY

Status	Version No.	Date	Comments
Draft	0.1	23.04.2003	Initial draft
Approved	1.0	16.07.2003	Approval
Draft	1.1	19.11.2003	Service manual Level 1&2 full version
Approved	2.0	21.01.2004	Approval

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1. INTRODUCTION

The purpose of this document is to help Nokia service levels 1 and 2 workshop technicians to carry out service to Nokia 6650. This Service Manual is to be used **only** by authorized Nokia service partners, and the content of it is confidential. Please note that Nokia provides also other guidance documents (e.g. Service Bulletins) for service partners, follow these regularly and comply with the given instructions.

While every endeavor has been made to ensure the accuracy of this document, some errors may exist.
If you find any errors or if you have further suggestions, please notify Nokia using the address below:
mailto:cc-ts-rc.documentation@nokia.com

Please keep in mind also that this documentation is continuously being updated and modified, so watch always out for the newest version.

Warnings and Cautions

Please refer to the phone's user guide for instructions relating to operation, care and maintenance including important safety information. Note also the following:

Warnings:

1. CARE MUST BE TAKEN ON INSTALLATION IN VEHICLES FITTED WITH ELECTRONIC ENGINE MANAGEMENT SYSTEMS AND ANTI-SKID BRAKING SYSTEMS. UNDER CERTAIN FAULT CONDITIONS, EMITTED RF ENERGY CAN AFFECT THEIR OPERATION. IF NECESSARY, CONSULT THE VEHICLE DEALER/MANUFACTURER TO DETERMINE THE IMMUNITY OF VEHICLE ELECTRONIC SYSTEMS TO RF ENERGY.
2. THE HANDPORTABLE TELEPHONE MUST NOT BE OPERATED IN AREAS LIKELY TO CONTAIN POTENTIALLY EXPLOSIVE ATMOSPHERES EG PETROL STATIONS (SERVICE STATIONS), BLASTING AREAS ETC.
3. OPERATION OF ANY RADIO TRANSMITTING EQUIPMENT, INCLUDING CELLULAR TELEPHONES, MAY INTERFERE WITH THE FUNCTIONALITY OF INADEQUATELY PROTECTED MEDICAL DEVICES. CONSULT A PHYSICIAN OR THE MANUFACTURER OF THE MEDICAL DEVICE IF YOU HAVE ANY QUESTIONS. OTHER ELECTRONIC EQUIPMENT MAY ALSO BE SUBJECT TO INTERFERENCE.

Cautions:

1. Servicing and alignment must be undertaken by qualified personnel only.
2. Ensure all work is carried out at an anti-static workstation and that an anti-static wrist strap is worn.
3. Ensure solder, wire, or foreign matter does not enter the telephone as damage may result.
4. Use only approved components as specified in the parts list.
5. Ensure all components, modules screws and insulators are correctly re-fitted after servicing and alignment. Ensure all cables and wires are repositioned correctly.
6. All PC's used with Nokia Service Software for this produce must be bios and operating system "Year 2000 Compliant".

Electrostatic discharge can easily damage the sensitive components of electronic products. Therefore every Service Supplier has to take care of all precautions, which are mentioned in the service level related "Service Partner Requirements", available on Nokia Partner Web Site. Also see ESD Protection Requirements in this Service Manual.

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2. GENERAL REPAIR INFORMATION

IN THIS SECTION THE TECHNICIAN WILL GET SOME GENERAL HINTS HOW TO CARRY OUT REPAIRS:

- To familiarize oneself with Nokia 6650 read the tutorials or user guide on www.nokia.com -->Support--> Phones, by selecting the Phone Model.
- Before starting the repair you must take care of ESD precautions like being in your ESD Protected Area and connecting your wristband.
- Use gloves to avoid corrosion and fingerprints.
- Protect windows and displays with a film to avoid dust and scratches.
- When cleaning the pads you have to use a soft cloth/ESD brush and Isopropanol. It is not allowed to use a glass fiber pencil because it scratches the surface and will lead later on to corrosion.
- Mechanical parts (except shielding lids), which didn't repair the failure, can be reused, if they are not soldered.
- When removing the shielding lids make sure to replace them with new ones, otherwise the high-frequency leakage can have an influence on the device.
- Use always original Nokia spare parts.
- Check the soldering joints of the parts which are concerned regarding the indicated error (e.g. soldered connectors or switches) and resolder them if necessary (Level 2 only).
- Remove redundant soldering flux after repair.
- Meet the torque requirements when assembling the unit (see also the document "torques for transceiver assembly" on Nokia Partner Web Site).
- Always use your own equipment for testing where you are sure that it works. E.g. if the customer complains about charger function, please test the phone with your own charger to be sure if phone or charger causes the malfunction.
- When doing the Faultlogger entries, always note the Item code, which caused the malfunction. Also, fill in the appropriate part code from the assembly, if needed.
- Please be aware that some malfunctions could be software related and solved by an update.

There are several Service Bulletins, which have to be followed:

First, take care for the latest content pages of Service Bulletins, which are always available on Nokia Partner Web Site. This is also important to recognize, if existing Bulletins have become invalid.

The service level indicator at the bottom of each document tells the appropriate destination.

Downloads > Support Library >

- **General Service Bulletins**
- **Service Tools Service Bulletins**
- **Spare Part Service Bulletins**
- **Common Softwares Service Bulletins**
- **Instructions**
- **etc,...**

Please check Nokia Partner Web Site (PWS) for latest news and files on a regular basis.

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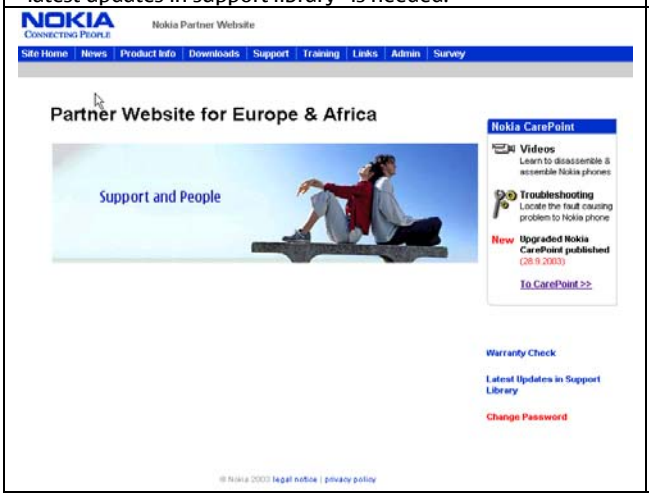
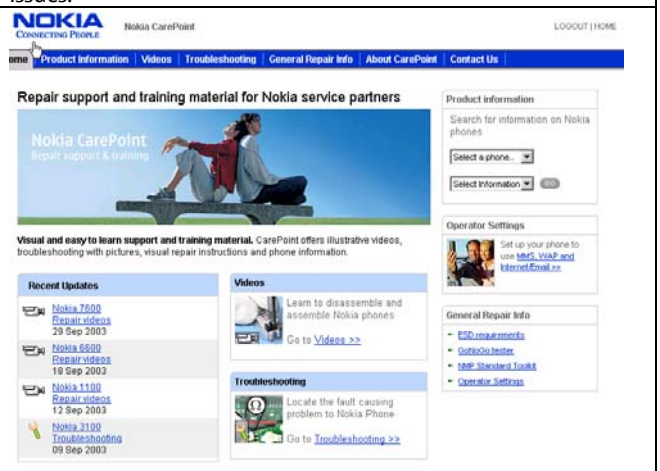
3. PATHFINDER FOR WORKSHOP STAFF

In addition to the information in this Service Manual, there are several instructions and information, which have to be followed.
Main documentation database is Nokia Partner Website, which refers also to Nokia Care Point with the purpose of serving different multimedia content, like video clips or interactive tutorials.

Nokia Partner Web Site		Nokia Care Point (access through Partner Web Site)
Nokia Partner Web Site for EMEA region is the most important document database for all service suppliers (level 1-4). All service relevant information like e.g. Service Manuals, Service Bulletins or general instructions are available. Content is restricted according your access level. To be kept up-to-date also concerning newest software updates, a daily check of "latest updates in support library" is needed.		Nokia Care Point is repair support and training channel for Nokia service suppliers (mainly for service levels 1 and 2). By providing visual and easy to learn support and training material, such as illustrative repair videos, troubleshooting with pictures, product information and general repair information, Nokia Care Point offers user-friendly channel for service partners to learn technical issues.
		

It is mandatory to watch for newest technical and organizational information on a daily basis to be updated as required (see "**Latest Updates in support Library**"). Every new information has to be processed and implemented as soon as possible.
When logged into PWS you can also find needed information in different folder like:

Downloads
→ Support Library
→
- Accessories
- Battery Tester
- Common Software
- Flashing Tools
- General --> Instructions
- GoNoGo Tester
- Service Tools
- Tester Support
- Wintesla
- Products (Service Manuals, Service Bulletins)

To spare server bandwidth it is recommended to download newest version of huge files like videos, Phoenix packages or Service Manuals only once and distribute it internally for further use.

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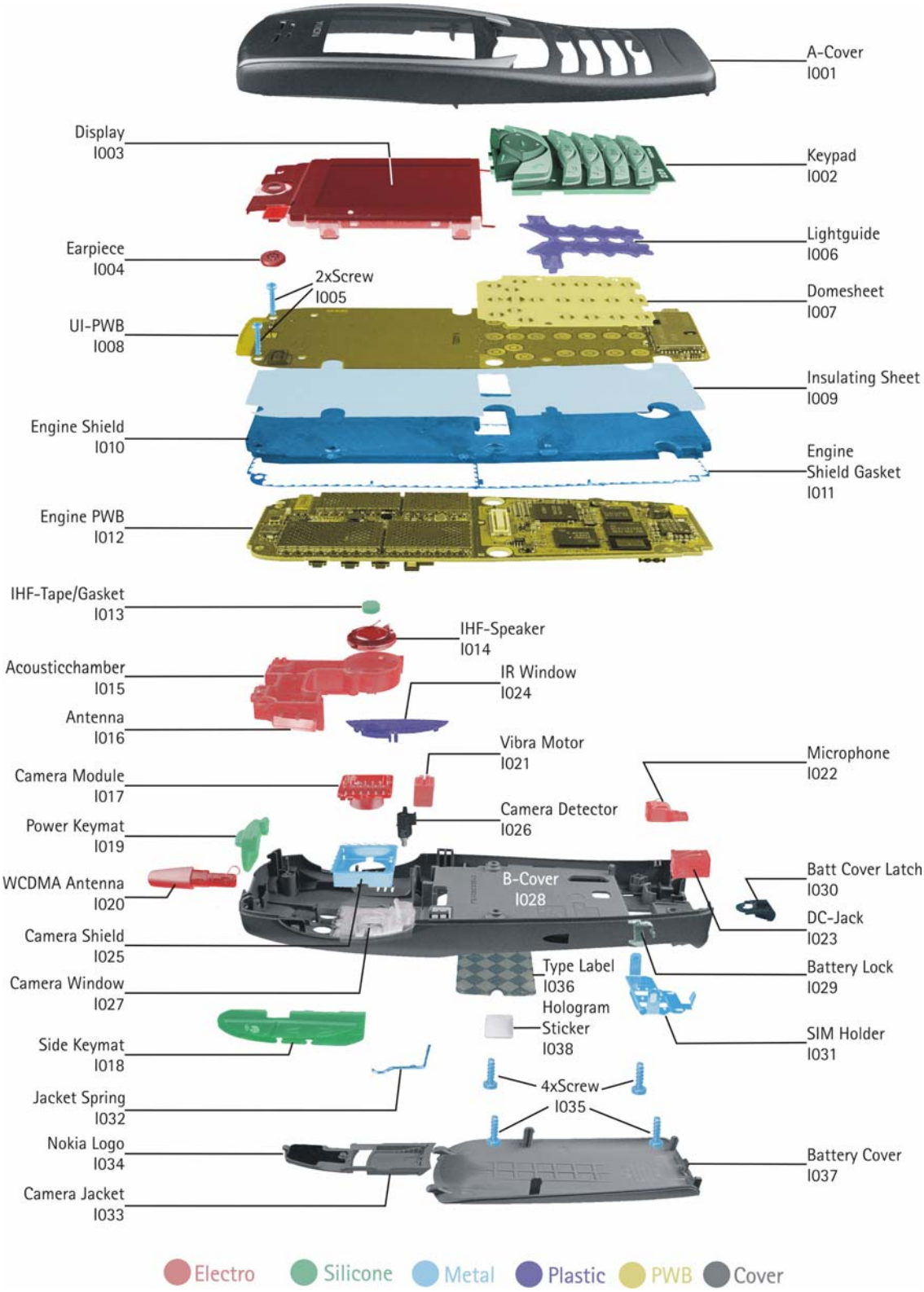
4. EXPLODED VIEW AND COMPONENT DISPOSAL

Recommendation for the ecologically friendly disposal of components. Colorized components show the different categories.



Description: See corresponding ITEM/CIRCUIT REF of the SPL (Spare Parts List)

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5. SPARE PARTS LIST

MECHANICAL PARTS

ITEM/ CIRCUIT REF.	QTY	PART NO	PART NAME
I001	1	9490522	A-COVER
I002	1	9794091	KEYPAD
	1	**4850301**	**DISPLAY MODULE ASSY**
I003	1	-	DISPLAY
I004	1	5140247	EARPIECE
I005	2	6150071	SCREW M1.8X11
	1	**9498000**	**UI-PWB ASSY**
I006	1	9460457	LIGHT GUIDE
I007	1	-	DOME SHEET
I008	1	-	UI-PWB
	1	**9517190**	**ENGINE SHIELD ASSY**
I009	1	-	INSULATING SHEET
I010	1	-	ENGINE SHIELD
I011	1	-	ENGINE SHIELD GASKET
I012	1	-	ENGINE PWB
	1	**9481208**	**ANTENNA ASSY**
I013	1	-	IHF-TAPE / GASKET
I014	1	-	IHF-SPEAKER
I015	1	-	IHF-ACOUSTICCHAMBER
I016	1	-	ANTENNA
I017	1	4858013	CAMERA MODULE
I018	1	9790655	SIDE KEYMAT
I019	1	9790654	POWER KEYMAT
I020	1	0660243	WCDMA ANTENNA
I021	1	6800055	VIBRA
I022	1	5140265	MICROPHONE
I023	1	5400243	DC-JACK
I024	1	9452407	IR WINDOW
	1	**-**	**B-COVER ASSY**
I025	1	-	CAMERA SHIELD
I026	1	-	CAMERA DETECTOR
I027	1	-	CAMERA WINDOW
I028	1	-	B-COVER
I029	1	9470163	BATTERY LOCK
I030	1	9470162	BATTEY COVER LATCH
I031	1	9517112	SIM-CARD HOLDER

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ITEM/ CIRCUIT REF.	QTY	PART NO	PART NAME
I032	1	9510921	JACKET SPRING
I033	1	9458438	CAMERA JACKET
I034	1	9430418	NOKIA LOGO
I035	4	6290093	SCREW M1.8X8
I036	1	-	TYPE LABEL
I037	1	9452413	BATTERY COVER
I038	1	9381333	HOLOGRAM STICKER

SOLDERING COMPONENTS ONLY FOR LEVEL 2

ITEM/ CIRCUIT REF.	QTY	PART NO	PART NAME
S165	1	5209001	SM SW TACT SPST 12V 50MA SIDE KEY
S166	1	5209001	SM SW TACT SPST 12V 50MA SIDE KEY
S167	1	5209001	SM SW TACT SPST 12V 50MA SIDE KEY
S170	1	5209001	SM SW TACT SPST 12V 50MA SIDE KEY
F100	1	5119019	SM FUSE F 1.5A 32V
V101	1	4864525	LED CL270WBKE ** RESERVED HDAF3**
V102	1	4864525	LED CL270WBKE ** RESERVED HDAF3**
B253	1	4700135	CELL CAPACITOR

SWAP UNITS

	QTY	PART NO	PART NAME
		0079153	NHM-1 N6650 SWAP UNIT EUROP&AFRICA

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6. SERVICE TOOLS

	0080541 FLS-4S incl. ACF-8, Driver and User Guide is a dongle and flash device incorporated into one package, developed specifically for POS use.
	0680032 ACF-8 Universal Power Supply is used to power FLS-4S.
	0271738 Internal Battery BLC-2 Inserted under the back cover, this Li-Ion 1000 mAh battery provides power in a lightweight package.
	0272169 Travel Charger ACP-8E **0272172 Travel Charger ACP-8X** Small and lightweight charger for fast charging of your phone battery.
	0274086 Headset HS-5 An easy and convenient handsfree solution with remote control.
	0273636 Stand DCV-14 Provides easy charging and convenient data synchronization with a compatible computer using the Connectivity Adapter Cable DKU-5 (supplied separately).
	0730218 XCS-1 Service Cable is used to connect FLS-4S to FLA 25.
	0770326 FLA-25 POS Flash Adapter is used in POS (Point of Sales) environment for software updating. It provides controlled supply voltage and necessary connections between the phone and the Flash Device. It substitutes for the phone's standard battery during the software update.
	0770450 New Test Pins for Flash Adapter FLA-25

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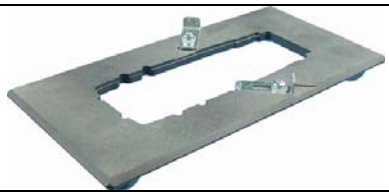
0730238 Nokia Connectivity Cable DKU-2
A USB cable for connecting a compatible PC and Nokia phone. This cable supports the use of Nokia PC Suite software. It enables transfer and synchronization of different data types - for example calendar, phonebook, notes, to-do list- depending on Nokia PC Suite version.



0770494 MJS-89
Soldering Jig (for Level 2 or higher service level supplier).

0772040 NMP Standard Toolkit

- Nokia opening tool SRT-6 Nokia No. 0770431
- Tonichi torque driver Nokia No. 6901525
- Hoya micro fibre cloth MX304
- Dastex gloves S, M, XL
- Artilux goggles AH166
- Wera bit T5 867/4TX 5x50
- Wera bit T6 867/4TX 6x50
- Wera bit T6 PLUS® 867/4TX 6IP
- Facom side cutter 416E
- Facom T5 driver SP.14032
- Facom T6 driver SP.14033
- Facom slot screwdriver AEF. 2x35.E
- Wetec tweezers 7abb SA-ESD
- Wetec tweezers 22 SA-ESD
- Wetec tweezers 13 SA-SMD ESD
- Wetec tweezers PSF SA-ESD
- Wetec ESD brush E1211
- Kaiser Fototechnik airbrush 6315
- Wetec dental tool DEM83266/0
- RS Components Scissors 323-5732

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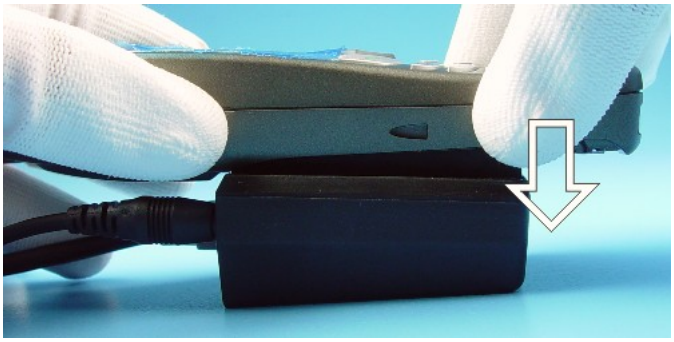
7. SW-UPDATE

To use FLS-4S Flash Dongle you have to follow the user guide inside the sales package. Please check always for the latest version of flash software, which is available on
Nokia Partner Web Site.

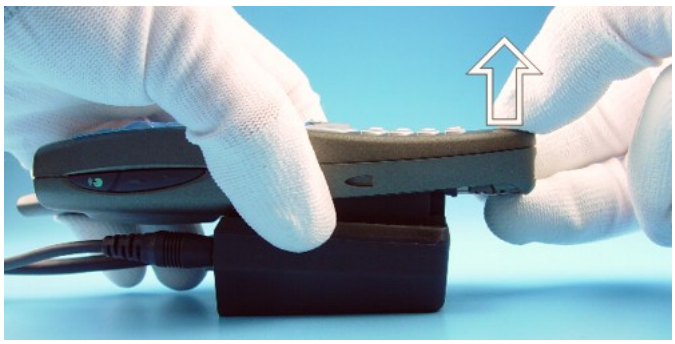
Flash Concept – (Point of Sales)

It is very important to follow this insertion and removal procedure, otherwise the contact pins of Flash Adapter will be damaged.

Insert the Flash Adapter FLA-25 like a battery, start at the Battery Connector side.



Now, push down the bottom side of the phone, do not use too much force.



When removing the phone, always start from the bottom side of the unit.

Take away the unit now.

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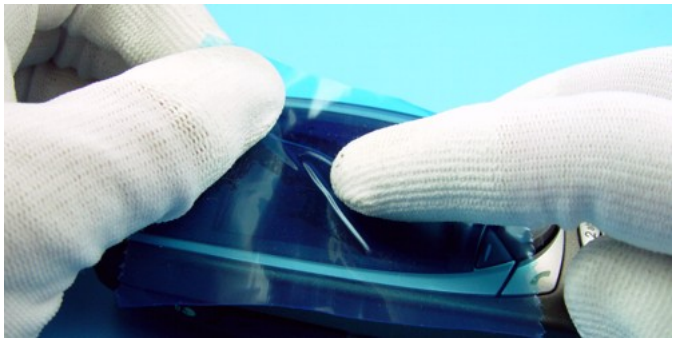
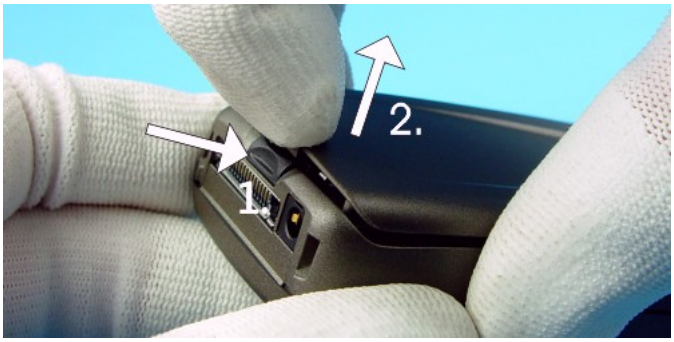
8. DISASSEMBLY INSTRUCTIONS (ALSO SEE THE VIDEO CLIPS ON CARE POINT)

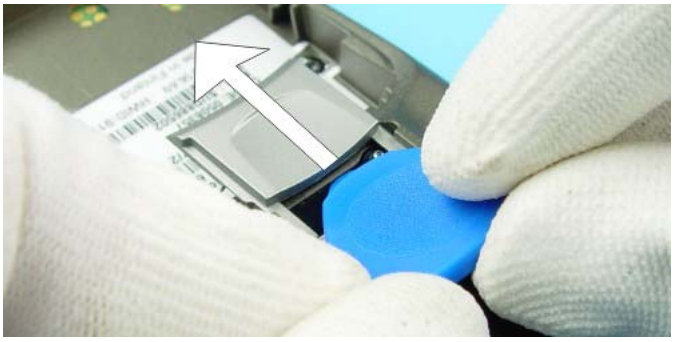


If not already done protect window with a film to avoid dust and scratches.



Remove the Battery Cover.

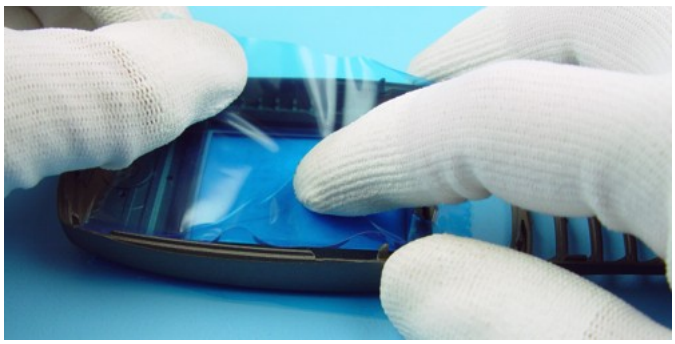
The Nokia Logo is attached with an adhesive tape. Remove it carefully by using the opening tool.



The Camera Jacket is attached with two hooks in its guidance. Push out the Camera Jacket with SRT-6 carefully, using additional force.

Unscrew the four TORX PLUS® size 6 screws, using the order shown. **For assembly, the same order and a torque of 24Ncm have to be used.**

Now, remove the A-Cover.



Protect window to avoid dust and scratches.

Protect LCD with a film, too.

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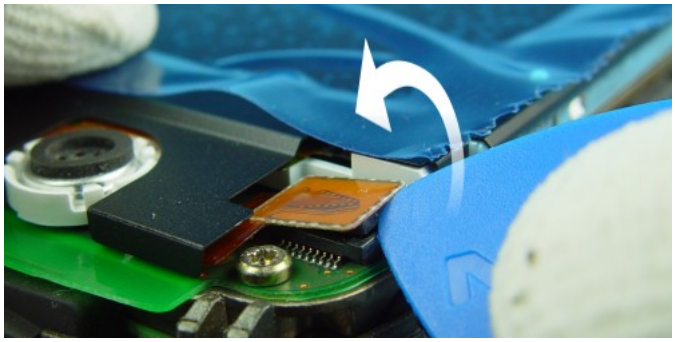
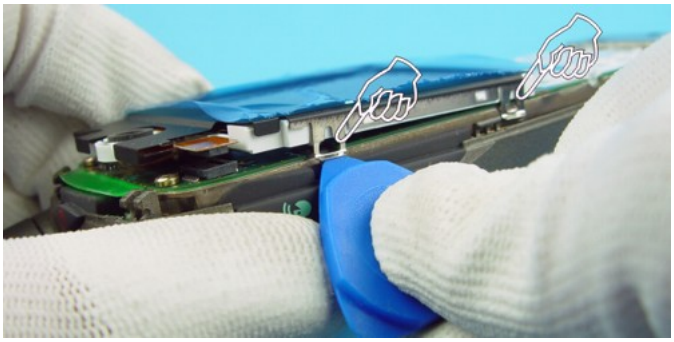


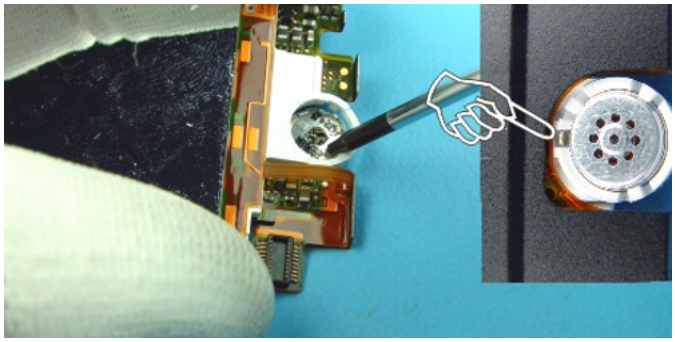
Open the connector carefully by using the SRT-6.



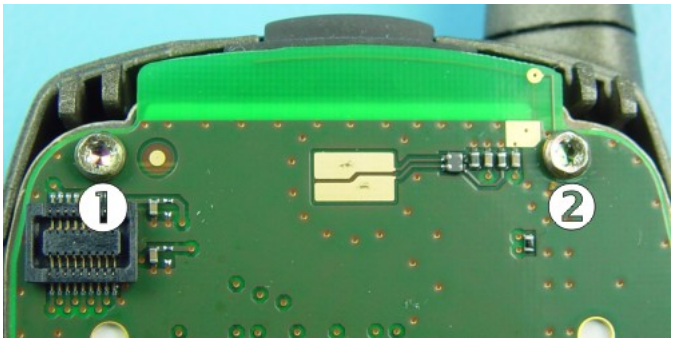
The Display is attached with four snaps to the Engine Shield. Release the snaps by using SRT-6.

The same procedure on the other side of Display.

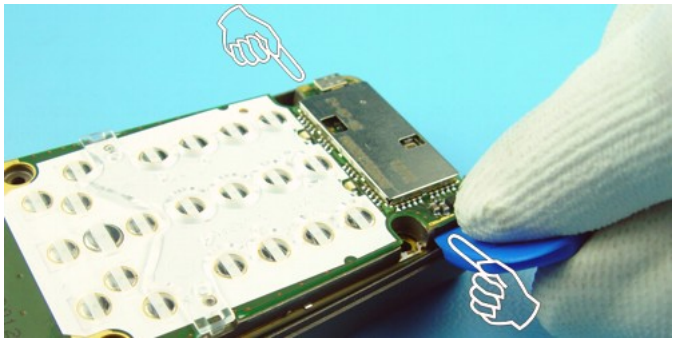
Now, the Display can be removed.



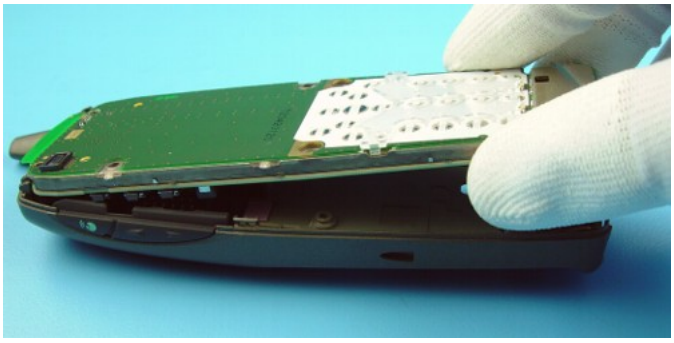
Push down the Earpiece from its guidance carefully. A screwdriver can be used for this. Do not damage the spring contacts of the Earpiece. Note the right position of the guiding pin from the Earpiece when assembling.



Unscrew the two TORX PLUS® size 6 screws, using the order shown. **For assembly, the reverse order and a torque of 24Ncm have to be used.**



There are two snaps, which lock the engine assembly. Use the Opening Tool to release the snaps.



Now the engine assembly can be taken away.

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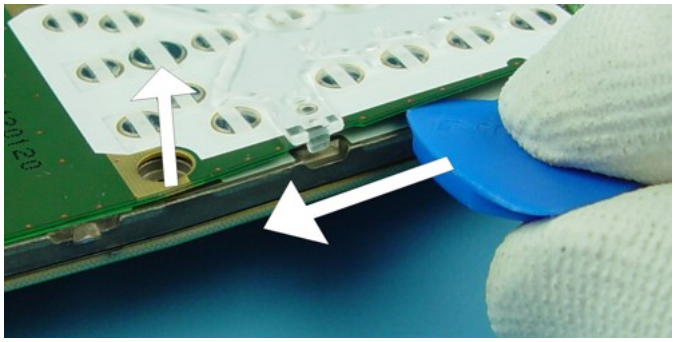
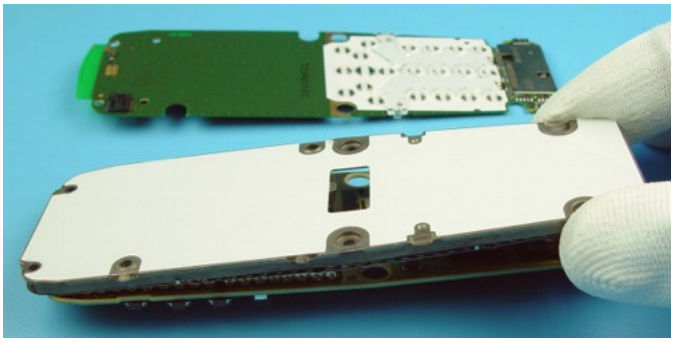
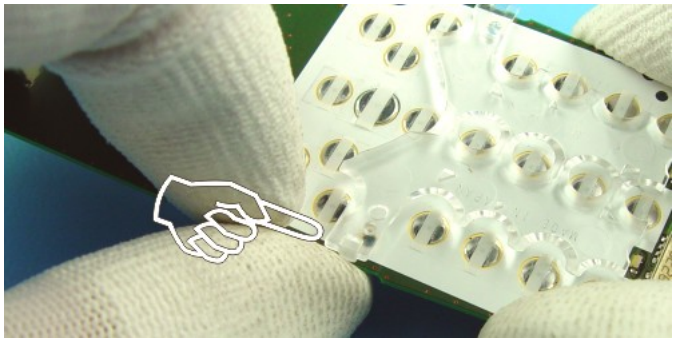


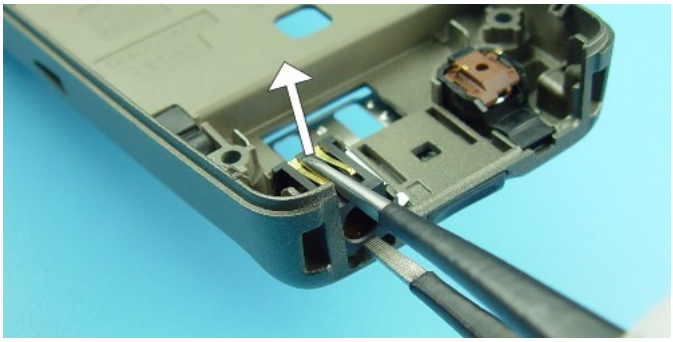
To separate the UI-PWB from Engine Shield use SRT-6 only. Place it between UI-PWB and Engine Shield and slide along the edge carefully as shown in the picture. Then use the opening tool as a lever.



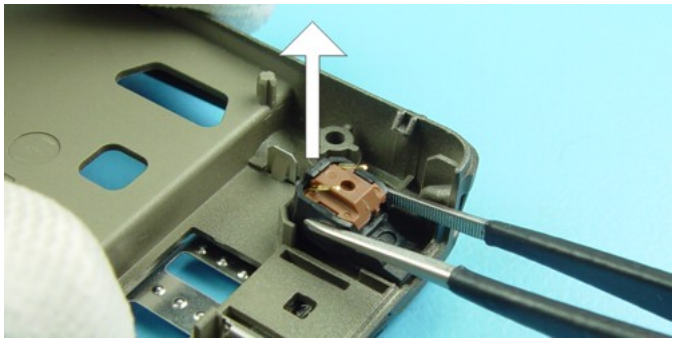
Now, the UI-PWB, Engine PWB and Engine Shield can be separated from each other.



Remove the Light Guide by opening the snaps.

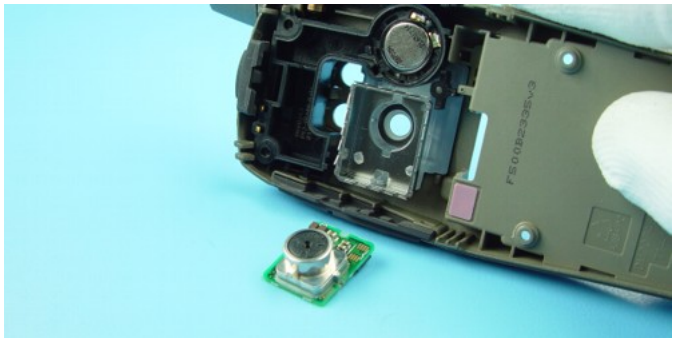


To remove the DC Jack, place tweezers between the spring contacts and under the Jack. You'll need to use additional force to pull the Jack upwards.

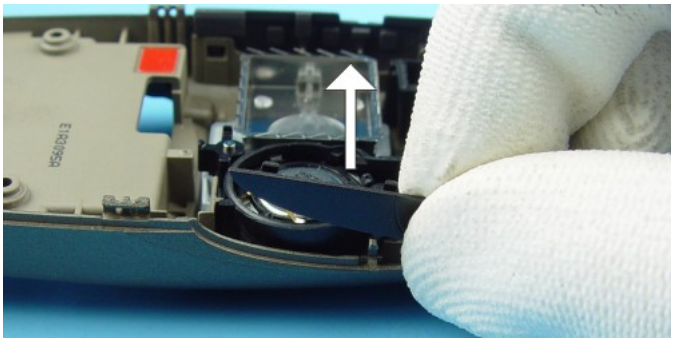


Remove the Microphone from its guidance carefully. Do not damage the spring contacts.

Remove the Vibra Motor from its guidance



Camera Module drops out when turning B-Cover.



Remove the IR Window as shown in the picture.

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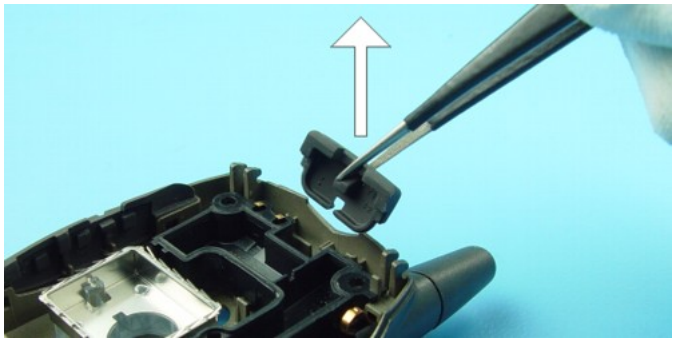
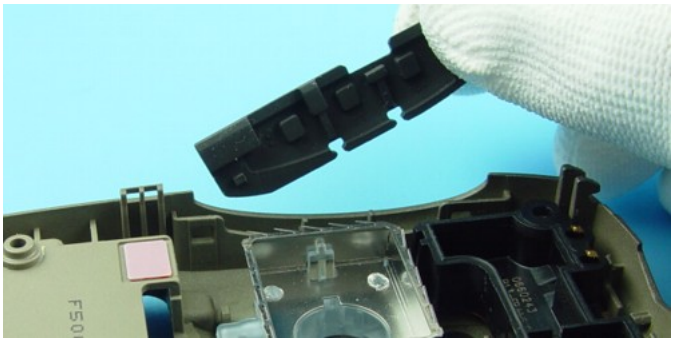
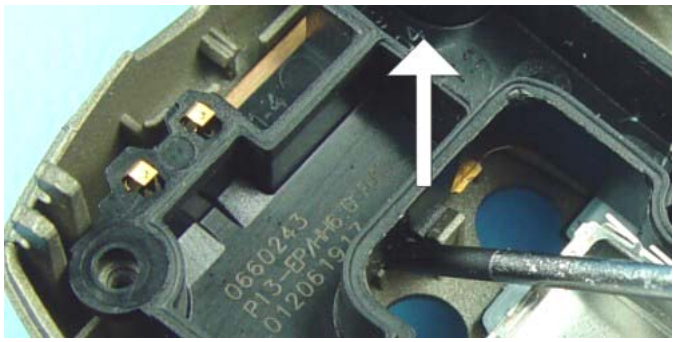
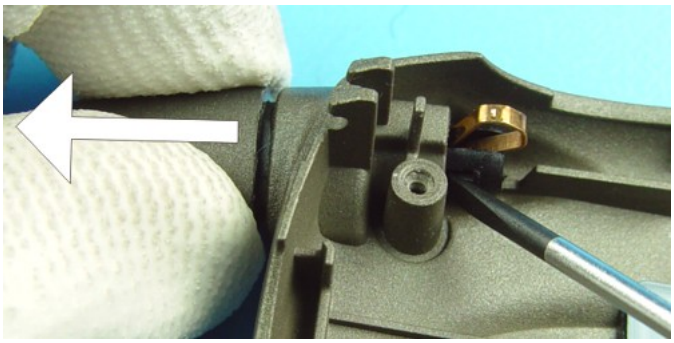
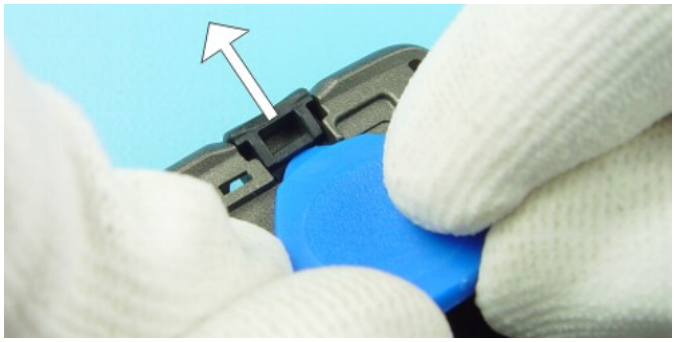
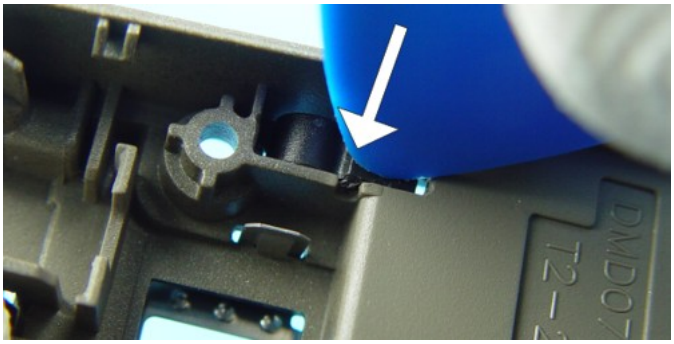

Remove the Power Keymat with tweezers.

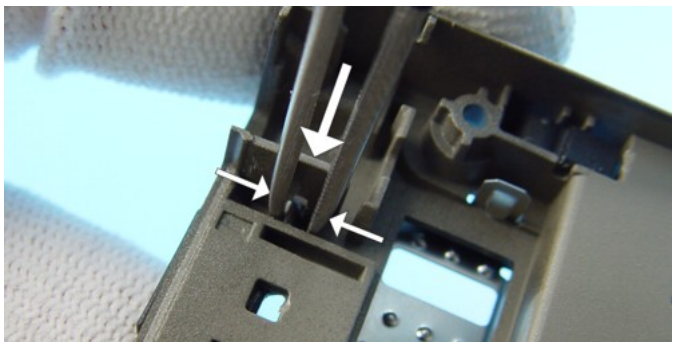

Side Keymat can be removed easily.

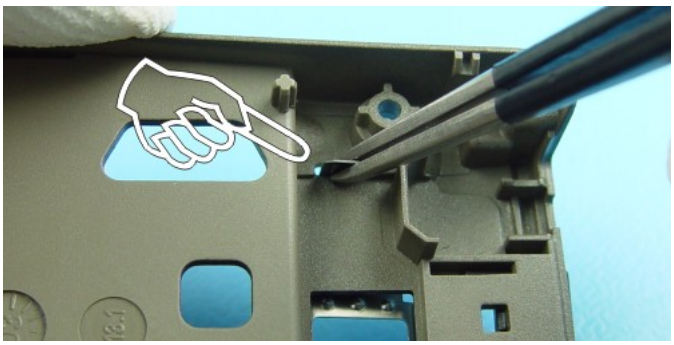

A slotted screwdriver can be used as a lever to remove the Antenna Assy like shown in the picture above.


The same screwdriver can be used to remove the WCDMA Antenna by pushing in the Antenna snap.


Push out the Battery Cover Latch with SRT-6 carefully.


Remove the Battery Lock from its guidance by using the SRT-6.


The SIM-Card Holder is attached with three hooks to the B-Cover. Compress the shown hook with tweezers first and then push it down.


Now, compress the next hook with the tweezers and push it down.

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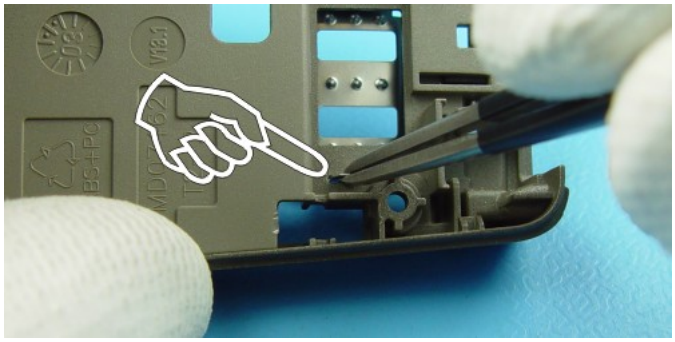
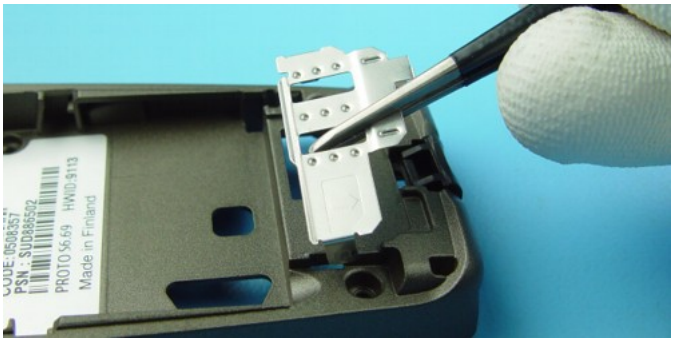


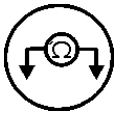
The same procedure on the other side of the SIM- Card Holder.



Now, the SIM- Card Holder can be removed.

9. LEGEND FOR QUICK TROUBLE SHOOTER

This legend is valid for all parts of the **Quick Trouble Shooter**

Follow the steps until the problem is solved. If this doesn't help, you are not authorized to go forward. Only underlined components (e.g. **I002**) can be changed.	
Fault symptom	The start point of repair activities regarding the appeared fault symptoms.
	Follow the arrows step by step
	Pads or contacts: Check optical and mechanical condition particularly regarding to corrosion. Clean if necessary.
	Measure component for electrical functionality and change, if needed. (Level 2 only)
	Pads or contacts: Check optical and mechanical condition particularly regarding to corrosion. Clean with ESD brush only, if necessary.
	No more actions possible send product to the appropriate service partner with higher service level.

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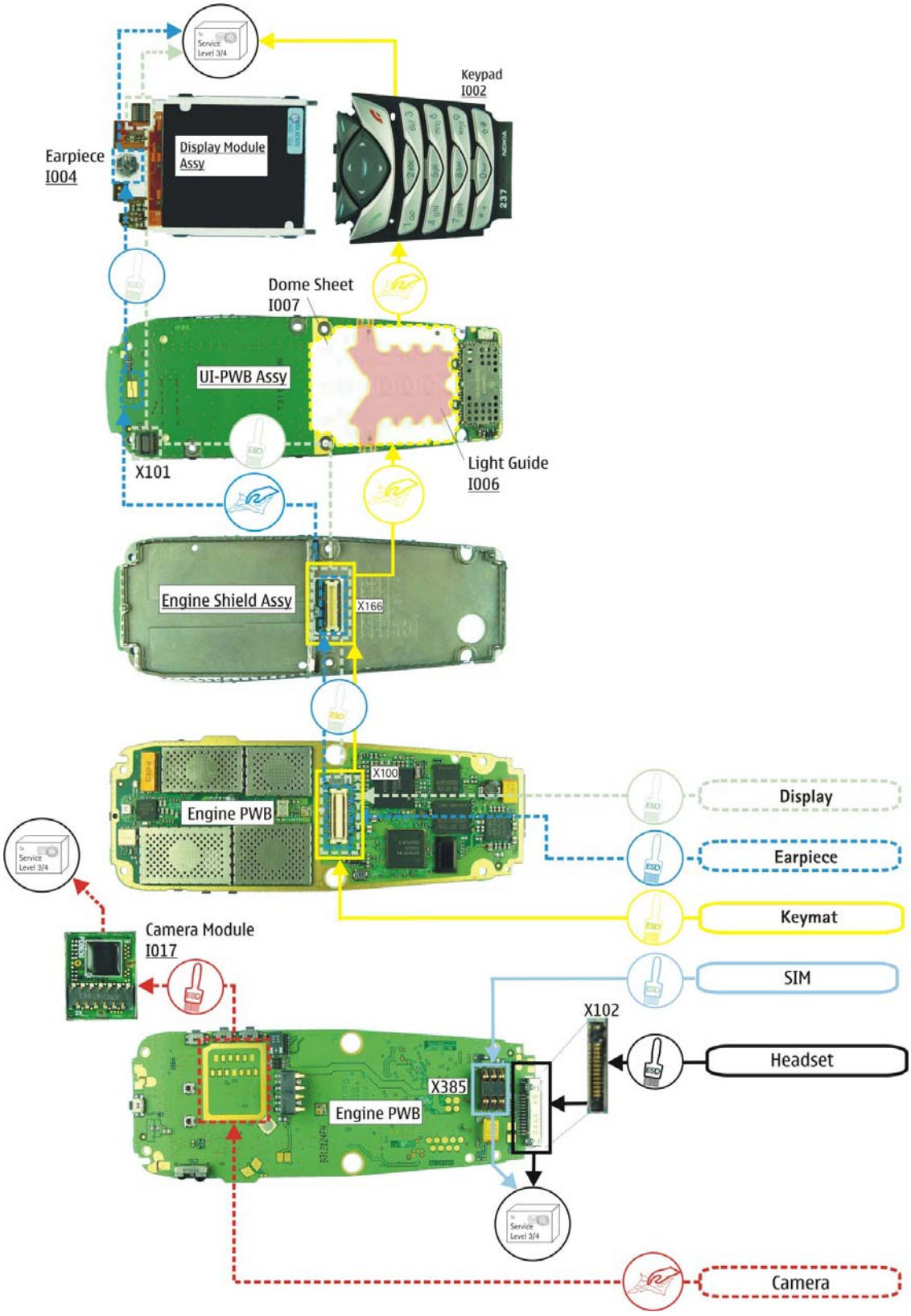
10. QUICK TROUBLE SHOOTER PART 1



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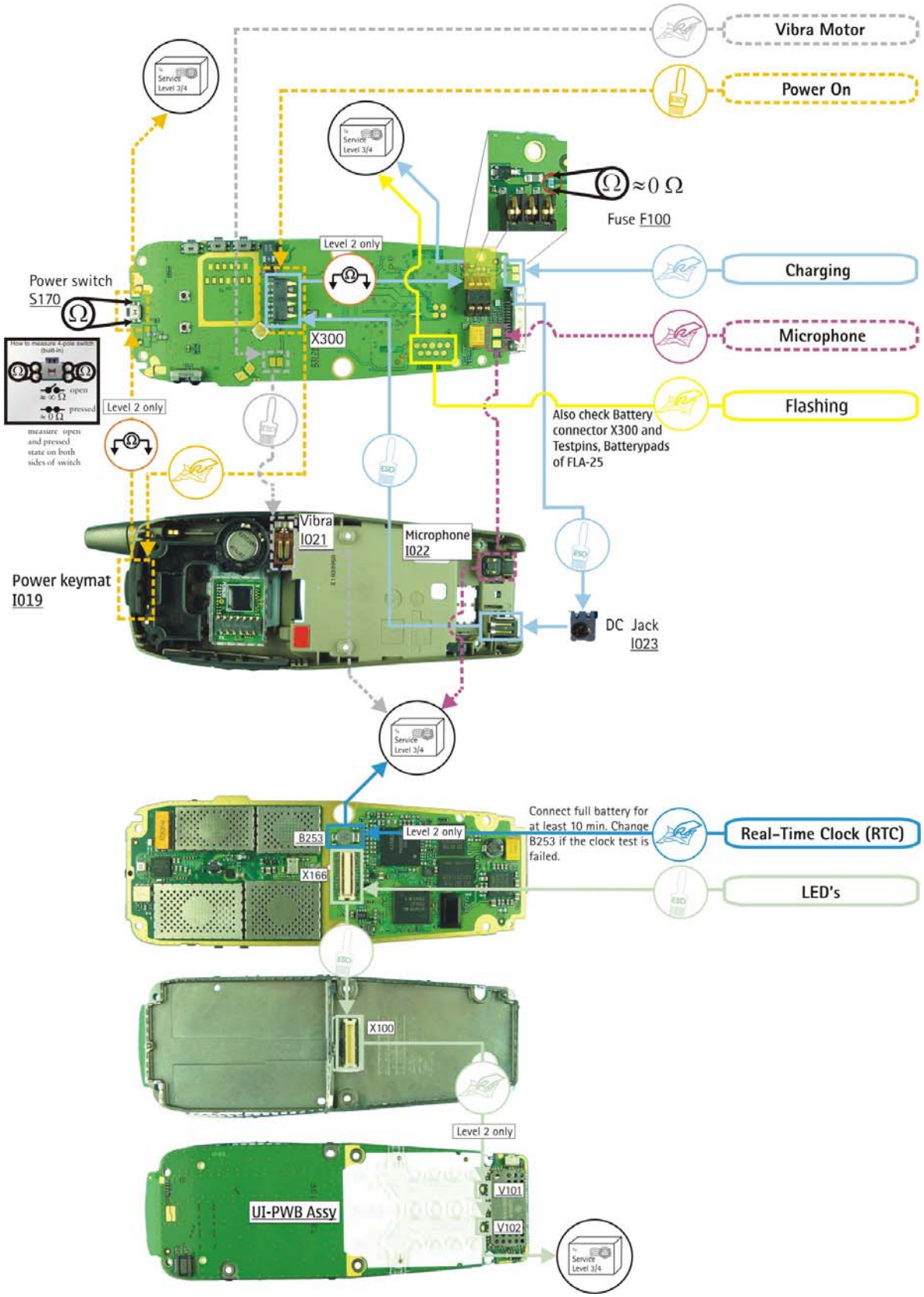
11. QUICK TROUBLE SHOOTER PART 2



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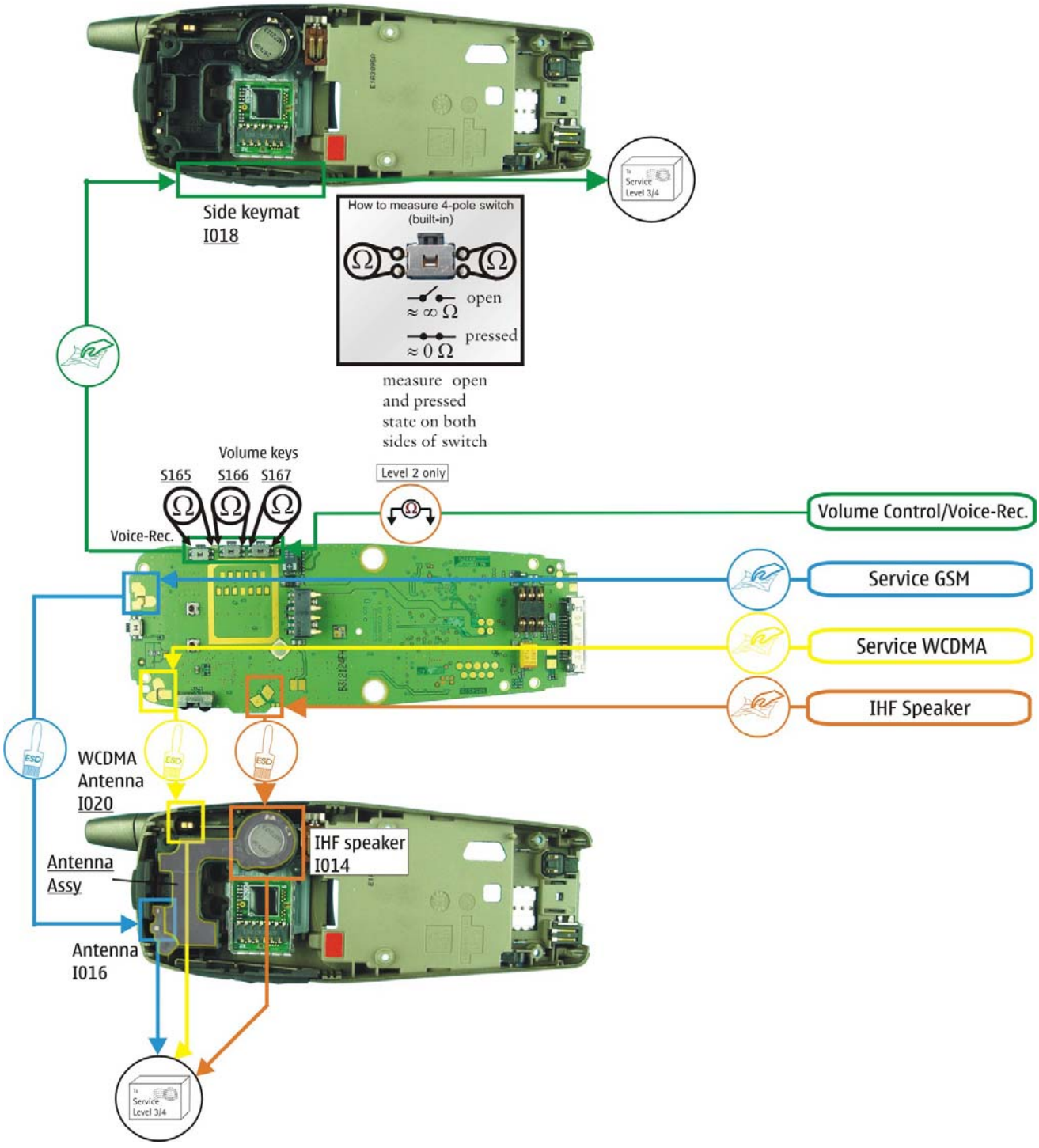
12. QUICK TROUBLE SHOOTER PART 3



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13. CAMERA GONOGO TEST

Before starting the GoNoGo test, check that camera window is clean. If not, clean the window with cloth.

- Open the lens cover
- Press Capture
- This Image will be saved to Gallery into the Photos folder automatically.
- Test was successful, if the Image appears on your Display. The camera is ok.
- Press **Delete**
- Select **Yes**
- Press the red receiver button for Home Menu
- Close the lens cover

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14. BLUETOOTH AND INFRARED GONOGO TEST

Bluetooth test
You need another Bluetooth device (e.g. 6310i) to do a GoNoGo test.
Make sure that Bluetooth is activated in the reference unit. The distance of the devices should be not more than 5m from each other.

Infrared test
You need another infrared device (e.g. 6310i) to do a GoNoGo test. The infrared windows of the devices must be directed to each other and should have a distance of approximate 15 cm. Make sure that infrared is activated in receiver device.

Warning: Do not point the IR (infrared) beam at anyone's eye or allow it to interfere with other IR devices. This device is a Class 1 Laser product.

Test unit

Reference unit, Bluetooth /infrared activated

Settings on the test unit:

- From Home Menu, push the navigation key up or down. This displays Phonebook entries.
- If phone and SIM memory is empty, create one new entry.
- Choose one phonebook entry and select **Details.**
- Select **Options**
- Select **Send bus. Card**

A) for infrared test: Select **Via infrared**

If sending of business card fails, make sure again that infrared windows are directed to each other and infrared is activated in reference device. Then try again sending.

Test was successful, if you get this message on receiver device.

You will **not** get a confirmation on sender device.

B) for Bluetooth test: Select **Via Bluetooth**

Search window appears, if all Bluetooth devices in range will be displayed, the test is successful!

- Press red receiver button for Home Menu.

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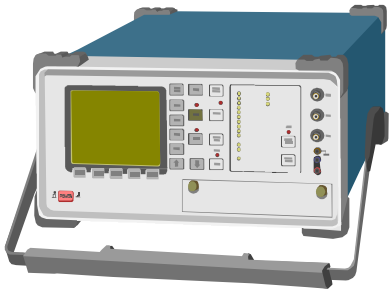
15. GONOGO TEST

After the optical check a GoNoGo test has to be carried out if the unit has been unscrewed to guarantee the functionality of the phone.

Please refer to the actual information on Partner Web Site and Nokia Care Point. When using delivered tester support files, take care of the right setup according to the tester type and product type.
Please refer to "Recommended Service Equipment" on Nokia Partner Web Site.



Mobile Phone Tester

16. BATTERY TEST

A battery tester lets you test the capacity of Nokia batteries.

Please refer to the actual information on Partner Web Site.

http://www.astratec.co.uk/

http://www.cadex.com/

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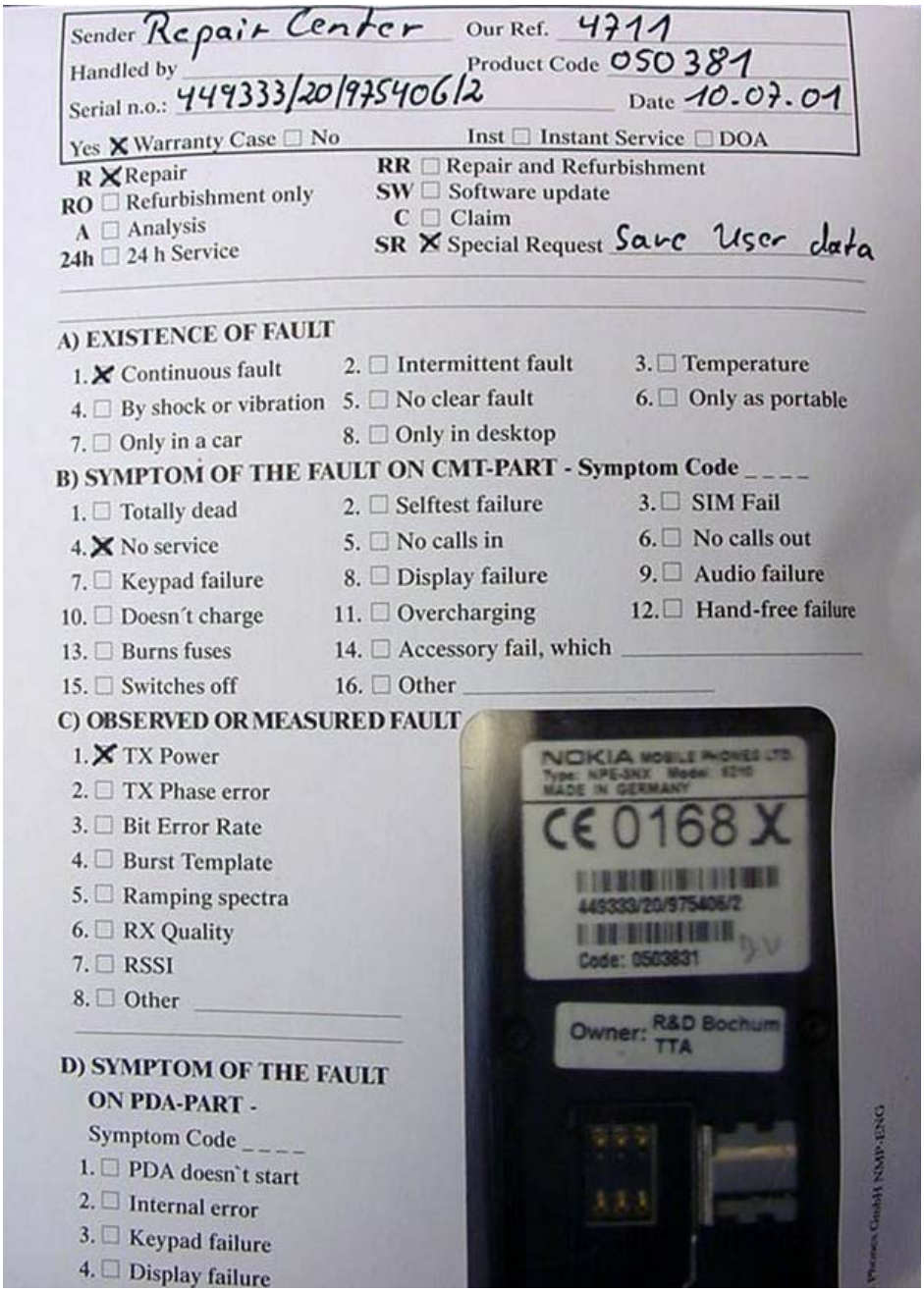
17. SERVICE NOTES

We recommend using Service Notes when shipping phones to other Service Partners. It prevents the product from scratches, it is ESD-neutral and has the possibility to give valuable feedback of the fault symptom through a structured form. Please refer to the document **Service Notes for faulty NMP transceiver** on Partner Web Site to get further information.



Sender Repair Center Our Ref. 4711
Handled by Product Code 050381
Serial n.o.: 449333/20/975406/2 Date 10.07.01
Yes ☒ Warranty Case ☐ No Inst ☐ Instant Service ☐ DOA

R ☒ Repair
RO ☐ Refurbishment only
A ☐ Analysis
24h ☐ 24 h Service
RR ☐ Repair and Refurbishment
SW ☐ Software update
C ☐ Claim
SR ☒ Special Request Save User data

A) EXISTENCE OF FAULT

1. ☒ Continuous fault 2. ☐ Intermittent fault 3. ☐ Temperature
4. ☐ By shock or vibration 5. ☐ No clear fault 6. ☐ Only as portable
7. ☐ Only in a car 8. ☐ Only in desktop

B) SYMPTOM OF THE FAULT ON CMT-PART - Symptom Code ____

1. ☐ Totally dead 2. ☐ Selftest failure 3. ☐ SIM Fail
4. ☒ No service 5. ☐ No calls in 6. ☐ No calls out
7. ☐ Keypad failure 8. ☐ Display failure 9. ☐ Audio failure
10. ☐ Doesn´t charge 11. ☐ Overcharging 12. ☐ Hand-free failure
13. ☐ Burns fuses 14. ☐ Accessory fail, which ____
15. ☐ Switches off 16. ☐ Other ____

C) OBSERVED OR MEASURED FAULT

1. ☒ TX Power
2. ☐ TX Phase error
3. ☐ Bit Error Rate
4. ☐ Burst Template
5. ☐ Ramping spectra
6. ☐ RX Quality
7. ☐ RSSI
8. ☐ Other ____

D) SYMPTOM OF THE FAULT ON PDA-PART -

Symptom Code ____

1. ☐ PDA doesn`t start
2. ☐ Internal error
3. ☐ Keypad failure
4. ☐ Display failure

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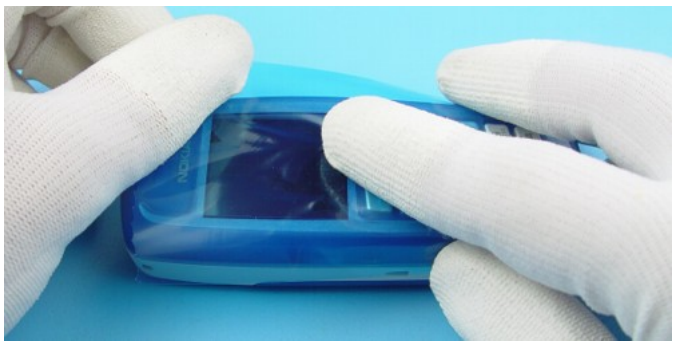
18. FORWARDING OF REPAIRS TO SERVICE LEVEL 3 OR 4 SUPPLIERS

We recommend using the offered swap phone cartons as described in Spare Parts SB-004.



Always Protect the window with a protection film.

Put the unit under the stretch film.

Add repair documentation e.g. filled-in service note into the swap carton.

Fold the swap carton as shown in Spare Parts SB-004.

There are two different sizes of swap cartons for common mobile phones.

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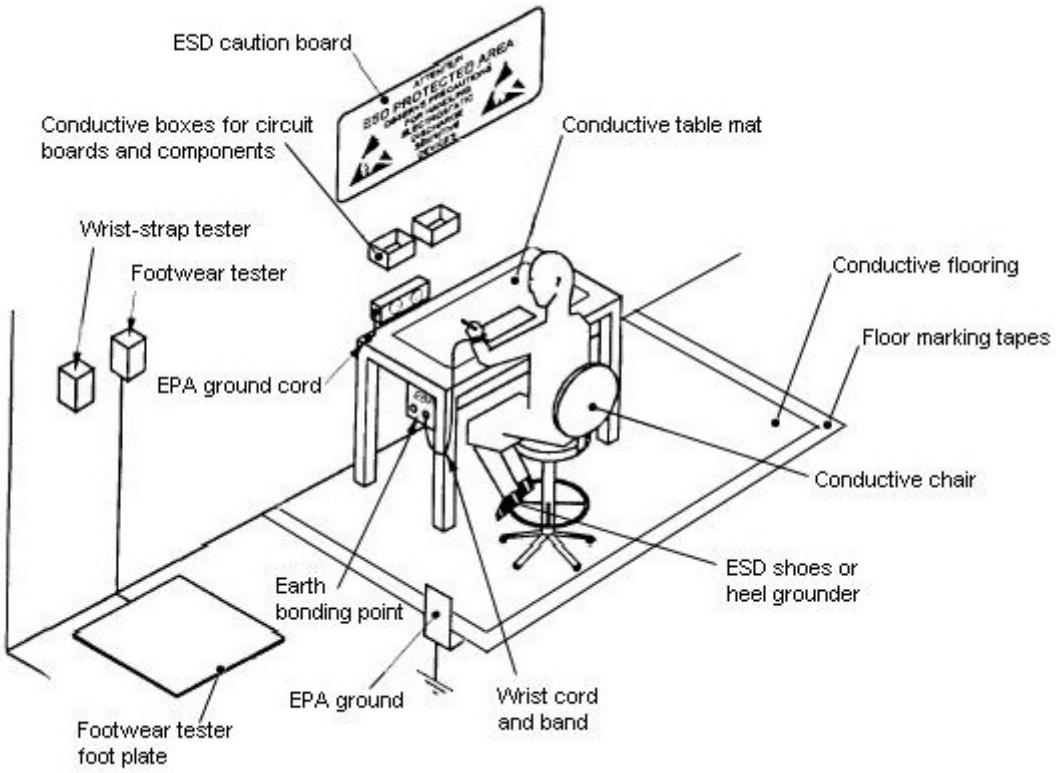
19. ESD PROTECTION REQUIREMENTS

Please refer to the Partner Web Site document
Service Partner Requirements in folder General instructions.



USE Conductive bags and boxes
USE ESD compatible service tools
USE Conductive wastebaskets
USE ESD gloves when handling PWBs/PCBs
USE Cleaning material without changing el. Characteristics
USE Grounded service equipment, i.e. soldering station
USE ESD clothes such as coat or frock

NO Smoking
NO Drinking
NO Eating
NO Dust
NO Useless Items
NO Normal pressured air for cleaning modules/displays

The video covers general issues concerning Electro-Static Discharge (ESD)
source: Nokia Care Point

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